

January 18<sup>th</sup> 2013

THE SENATE STANDING COMMITTEE ON ENVIRONMENT AND COMMUNICATIONS

**Re: Submission for the enquiry into recent trends in and preparedness for extreme weather events**

My background is that until recently a Principal Research Scientist with the Australian Defence Science and Technology Organisation (DSTO Melbourne), where until my retirement in October 2010, I led a group specialising in machinery health monitoring for ADF aircraft, and also aircraft noise and vibration issues. I hold a current Private Pilot's licence, with around 1500 hours command experience in a variety of aircraft, ranging from fixed and rotary wing, and gliders.

This enquiry has some personal relevance for me, as our former home at 310 Ninks Rd St Andrews Victoria, was destroyed in one of the Feb 2009 'Black Saturday' bushfires – this fire started at Kilmore East, apparently as a result of a power line failure and resultant sparking. I have attached a picture of the house after the fire.

I fully support the intent of this enquiry to encourage preparedness. The comments I wish to make revolve around just one aspect, that relating to the fire safety issues surrounding the newly emerging wind farms in this state (and throughout Australia). In Australia, large scale wind farms have only been operating for a relatively short period of time. One of the aspects of preparedness that I believe needs to be examined closely relates to firefighting capability, where a fire may be generated by an unrelated cause, or by the turbine itself, and in particular the issues that could arise because of the following limitations:

1. Access by ground fire fighting vehicles, and the limitations that will impose on effectiveness.
2. Access by aerial (water-bombing) aircraft, both fixed and rotary wing.
3. Access by fixed wing crop duster type aircraft using fire retardant.

I raise the three issues above, as it not practical, for personnel safety reasons, for aircraft to operate in close proximity to a wind farm, or for ground based vehicles to approach too closely. For aircraft, there is the obvious question of visibility – the blade tip speeds are of the order of 250-300 km/hr – and especially side on, virtually invisible. A pilot would not fly through a wind farm, nor would they operate at low altitude – in part because of the problem in judging proximity to the moving blades, and the possibility of a turbine shedding blades. For ground based vehicles, there is the issue again of blade failure, which would lead to failure of the tower due to unbalance, or other system failures. Through my work with helicopter transmission health monitoring and early failure detection, I am aware that

there are monitoring systems on the wind turbines; however no system is 100% free of failure.

The other area of concern relates to the effect of a bush/grass fire on the integrity of the turbine itself – the turbine blades are composite (carbon/glass fibre epoxy resin), and their strength diminishes very rapidly at a temperature termed the 'glass transition temperature -  $T_g$ ', which is close to the temperature the resin is cured at. This could be quite low – I do not have the precise figures for the current turbine blades, but I would expect the strength to diminish above 100 deg C, and quite seriously weakened at 150 Deg C. The implication is that in a ground fire, the blades could be exposed to high temperatures, leading to structural failure, which could then quite possibly topple the pylon due to the large unbalance forces due to a single separated blade.

My recommendation to address the above issues would be to have a comprehensive review by properly independent experts – I am not especially confident that the assurance given to local planning authorities to date has been adequate or comprehensive. Neither do I think a local government planning authority has the expertise to properly assess all of the technical issues. The detail of such documents as a FMECA (Failure Modes Effect Analysis) need to be properly reviewed. In the Aviation sphere, there are some very good benchmarks for this type of analysis. However, I am not confident that the same forethought and planning has gone into the issues of wind farms and fire risks.

And finally, a question which is very relevant in view of several class actions currently underway with regard to the Black Saturday fires – is what insurance is in place should the outbreak of a fire be found to be due to a turbine malfunction? (as has happened in the past and will in the future). The Kilmore East Black Saturday fire caused damage estimated by the Royal commission as being of the order of \$1 Billion. Whilst I was personally compensated for the loss of my home by my Insurer, that insurer (as will most others) will be seeking damages from SP AusNet through this class action for the faulty power line which is believed to be the cause. Will the wind farm developers have adequate insurance for this sort of eventuality?

Finally, I also attach a picture I took of a segment of the Waubra Wind Farm, on a flight in 2011 from Kyneton to Ararat Vic. This indicates some of the scale of the property encompassed by just a relatively small segment of the total of 128 turbines at Waubra, and the likely difficulty of fire access with personnel safety.

Yours Sincerely

Brian Rebbechi

Attach:

1. Picture of Rebbechi 310 Ninks Rd Vic home post-2009 Black Saturday Fire
2. An aerial pictures of a small segment of Waubra wind farm by, taken by self from Cessna -172 cockpit at around 4000 ft AMSL.

